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(54) **Ventilated brick**

(57) A ventilated hollow brick adapted to building ventilated walls, characterized in that, in addition to usual holes, it has at least one inferiorly and superiorly open inner ventilation chamber (10), adapted to freely communicating with the corresponding chamber(s) of the inferior and superior bricks, so as to realize an air chamber extending as the whole surface to be ventilated, as well as means (17) for inlet of air into the bricks of the bottom row of said wall and means (18) for outlet of air from the bricks of the top row of said wall.

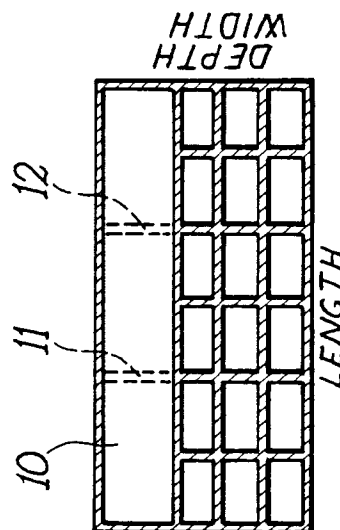


FIG. 1

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Description

This invention broadly relates to manufactured articles for building and more particularly it concerns a ventilated brick, namely a brick intrinsically adapted to build ventilated walls.

As it is known to those skilled in the art, a ventilated wall comprises, starting from the external surface, a paneling of not noticeable thickness made of various materials (namely aluminum boards, glass, ceramic, asbestos-cement plates, and so on), an air chamber or air space of a few centimeter thickness, then a layer or board of insulating materials of various types commonly used in building to this effect, and then the closure wall of the construction, this also of various types. The first outer paneling is supported by structural steel bars and various attachment devices to the rear wall, since the panel is to be arranged at a certain distance therefrom in order to form the above mentioned air chamber. The insulating layer or board, which is adjacent thereto, is simply applied upon said wall.

The so obtained air chamber communicates with the external environment by means of a bottom aperture and a top aperture, formed at the bottom and at the top sections, respectively, of said outer paneling. Furthermore, said apertures are usually covered by masks, so as to enhance air circulation with a so-called stack effect.

The advantages of ventilated walls with respect to other kinds of walls can be easily understood by considering that the more the most insulated components of the wall are outwardly arranged with respect to the other wall components, the better the results are from a thermal and hygrometric view point.

In such walls, as a matter of fact, the effect of the air contained in the chamber existing behind the outer paneling and then the effect of the insulating material per se are to be considered together with the additional and noticeable advantage that, in summer season, the environmental air is heated and flows upwardly thereby lapping the insulating material and exiting from the wall through its top aperture.

In view of the above outlined state of the art, the broad object of this invention is to realize a brick for building ventilated walls, having a suitable shape adapted both for bearing walls, and for walls supported by beams and pillars, in view of its manufacturing and structural details, of the materials, of thicknesses and relative strengths commonly encountered in this utilization.

Essential features of a ventilated brick according to this invention are, therefore, the presence of one or more suitably sized chambers, according to the length of the bricks to be installed outwardly of the building, the possibility to maintain in large and regulated contact the air which is contained in such chambers with the external environment, as well as the possibility to easily apply an insulating material in its most suitable position.

The length of said chambers ranges from a value corresponding to their depth up values suitably determined by the strength of the outer wall itself, according to the materials used therein and up to the length of the brick, which, in turn, depends on the handling characteristics and on the size ranges of the bricks to be conveniently provided.

The depth of the air chambers is established by the results of the thermal design computation and broadly ranges from two to twelve centimeters in respect to the section involved in free circulation of the air, plus the additional thickness of the insulating material that, as it will be described, will be considered as conveniently applicable to the chambers themselves.

The depth of the chambers in bricks of a given set or type, when all other characteristics are the same, can be constant, or it can vary so as to utilize, in upwardly building direction, rows of bricks having different depth values, so as to fulfill the operation requirements in respect of such walls.

Further details and advantages of this invention will be apparent from the following description by referring to the annexed drawings wherein the preferred embodiments are shown by way of illustration rather than by way of limitation

In the drawings:

Figure 1 shows a horizontal cross-section view of a first embodiment of a brick according to this invention;

Figure 1A shows a modified embodiment of the brick of Figure 1 wherein two outer baffles have been eliminated;

Figure 2 shows a horizontal cross-section view of a second embodiment of a brick according to this invention;

Figure 2A shows a modified embodiment of the brick of Figure 2 wherein two outer baffles have been eliminated;

Figure 3 shows a horizontal cross-section view of a third embodiment of a brick according to this invention;

Figure 3A shows a modified embodiment of the brick of Figure 3 wherein two outer baffles have been eliminated;

Figure 4 shows vertical cross-section view of a brick according to Figure 1;

Figure 5 shows a perspective view of a brick according to Figure 1A;

Figure 6 shows a front elevation view of a brick suitable for forming the top row of bricks by which the ventilated wall is built;

Figure 7 shows a front elevation view of a brick suitable for forming the bottom row of bricks by which the ventilated wall is built;

Figure 8 shows a vertical cross-section view of the brick according to Figure 6;

Figure 9 shows a vertical cross-section view of the

brick according to Figure 7;

Figures 10, 11 and 12 show horizontal cross-section views of special articles to be used in realizing narrow ventilated walls to be applied to already built walls.

By referring now to the drawings, it can be observed that the basic embodiment as shown in Figure 1 has a single chamber 10, which can possibly divided into three smaller chambers or sections by means of baffles 11, 12 indicated in dashed lines.

In the embodiment of Figure 2, the inner chamber has, in addition to a possible separation baffle 13, also ribs 14 to be used in order to rigidly position a board of insulating material.

In the embodiment of Figure 3, the brick has a first chamber 10 for ventilation purposes and a second chamber 15, arranged behind the first one, particularly designed for housing a board of insulating material. This embodiment allows for a greater flexibility among various types of insulating materials to be suitably used: in fact, insulating materials also having scarce strength characteristics or even the air itself can be suitably used.

In all embodiments of Figures 1, 2 and 3, it is possible to spray a suitable insulating material to this effect upon the inner wall of the chamber and/or, as far as the first embodiment is concerned, to glue a board thereto or to position a U-shaped board therein (so as to space it from the front wall).

In Figures 1A, 2A, 3A and 5A, further modified embodiments corresponding to the embodiments of Figures 1, 2, 3 and 5 are shown, wherein some baffles have been omitted so as to eliminate possible thermal bridges (thermal shunts). In fact, it has been ascertained that a relevant role in heat transmission through walls is played by any thermal bridges or shunts.

Considering now a wall in its whole, the bricks of the first row starting from the bottom and the bricks of the top row, also when the first row is positioned upon a cantilever roof, a balcony or a window and the top row is positioned under any one of the above structural items, are special bricks, such as those shown in Figures 6 and 7, for the bricks of the top row and for the bricks of the bottom row, respectively. As far as such bricks are concerned, the absence is to be noted of a horizontal wall strip 17, 18 aimed at creating an elongated aperture for inlet of air from bottom and exit thereof from top or, in other words, the ventilation of the wall under stack effect. Such apertured wall strips 17, 18 are protected by suitable masks, with a possible grid to prevent entry of insects, for adjusting the air flow rate.

Should it be desired to create a ventilation also in front side of beams and columns of supported walls and in front side of any load distribution bead of bearing or supporting walls, special bricks are provided, as shown in Figures 10, 11 and 12, simply consisting of those portions which define the front ventilation chamber(s). Such special bricks, which are provided with suitable anchor-

age protruding ribs 19 can be applied to the corresponding side of the forms used in manufacturing said beams, and so on, before the concrete casting operation is carried out.

The above mentioned special bricks can additionally be used in manufacturing ventilated walls on already existing masonry structures: in this case, in addition to the possibility to attach them by means of mortars or glues, it is possible to attach them by means of suitable hooks.

The front finish of a brick according to this invention is such that it can be furnished either in raw condition, for plastering, for tiles, and so on, or in directly finished condition as a bare brick, with plain surface or with protruding formation of various shapes and patterns.

The advantages deriving from manufacturing a ventilated wall by using the bricks according to this invention should now be evident from the above description. The cost advantage is noticeable, since the thermal and hygro-metric behavior is just the same as with a conventional and more expensive ventilated wall, while its effective cost is the same as the cost of a corresponding normal not-ventilated wall, either in its raw condition, or in its bare condition, of course regardless of the advantage connected with the obvious reduction of the working time needed for its manufacture.

Aesthetical advantages are also achieved when is desired to have the concerned bricks exposed to sight as surface covering with its structural characteristics, rather than having tiles applied so as to look like bricks.

Furthermore, the concerned brick can be advantageously used when it is desired to build a second wall adjacent to the outer one, as it usually occurs, so as to leave an air chamber therebetween.

By using bricks according to this invention and since these bricks are provided with air chambers as above described, it is possible to juxtapose the second wall to the first one and this possibility makes the second wall easier to be made and less expensive, because the vertical as well as the horizontal alignment operations are reduced and the required training degree of the workmen charged with building such second wall is lower.

The preferred embodiments have been heretofore described and some modifications have also been suggested, but it should be understood that those skilled in the art can make further variations and changes in details and manufacturing particulars without so departing from the scope of this invention as defined in the annexed claims.

Claims

1. A ventilated hollow brick adapted to building ventilated walls, characterized in that, in addition to usual holes it has at least one inferiorly and superiorly open inner ventilation chamber (10), adapted to freely communicating with the corresponding cham-

ber(s) of the inferior and superior bricks, so as to realize an air chamber extending as the whole surface to be ventilated, as well as means (17) for inlet of air into the bricks of the bottom row of said wall and means (18) for outlet of air from the bricks of the top row of said wall. 5

2. A ventilated brick according to claim 1, characterized in that said inner ventilation chamber (10) is divided into separate vertical sections by means of separating vertical baffles (11, 12). 10
3. A ventilated brick according to claims 1 and 2, characterized in that, in addition to said at least one inner ventilation chamber (10), it further comprises retaining means (14, 15) for applying a board of insulating material thereto. 15
4. A ventilated brick according to claim 3, characterized in that said retaining means are made by protruding inner ribs (14). 20
5. A ventilated brick according to claim 3, characterized in that said retaining means are made by a further inner chamber (15) positioned behind said at least one inner ventilation chamber (10). 25
6. A ventilated brick according to any one of the preceding claims, characterized in that usual holes are absent and anchorage protruding ribs (19) are provided at its rear surface, so as to install the brick on beams, pillars and like. 30
7. A ventilated brick according to any one of the preceding claims, characterized in that said air inlet and outlet means are made by horizontal apertures (17, 18) provided at the lower edge and at the upper edge, respectively, of the brick. 35
8. A ventilated brick according to claim 7, characterized in that said apertures are protected by a mask and possibly by an anti-insect grid. 40
9. A ventilated brick according to any one of the preceding claims, characterized in that some segments of the side walls of the bricks or some baffles defining its inner chambers are eliminated so as to reduce the possibility that thermal bridges are created therein. 45
10. A ventilated brick according to any one of the preceding claims and substantially as described in the description and shown in the enclosed drawings. 50

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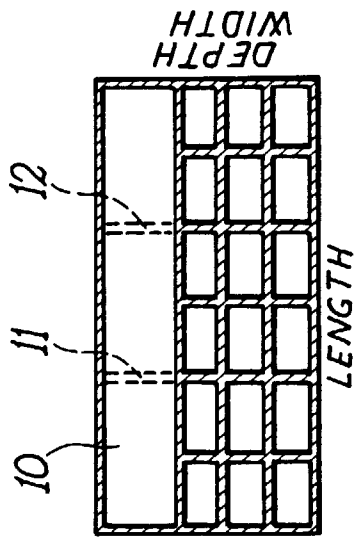


FIG. 1

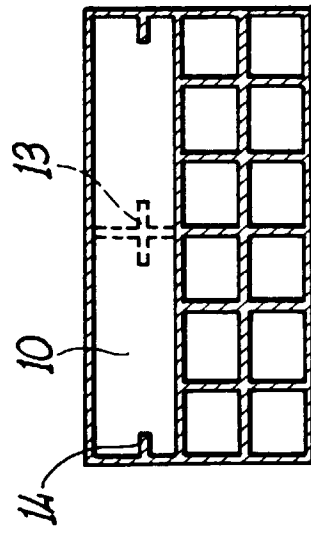


FIG. 2

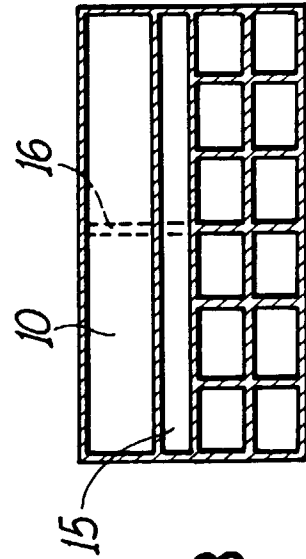


FIG. 3

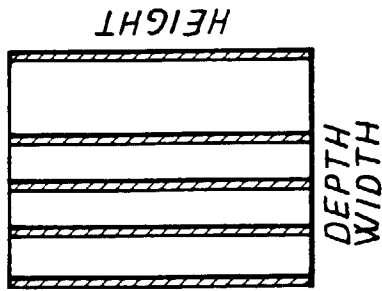


FIG. 4

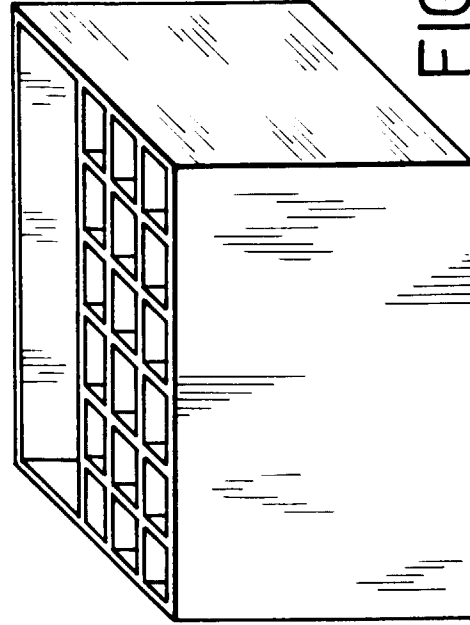


FIG. 5

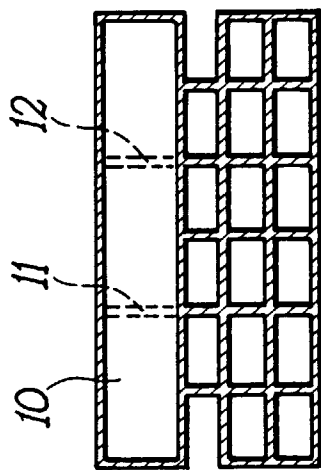


FIG. 1A

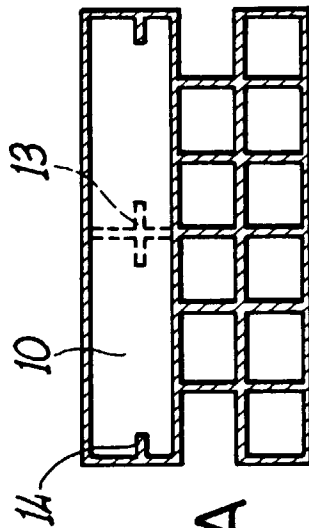


FIG. 2A

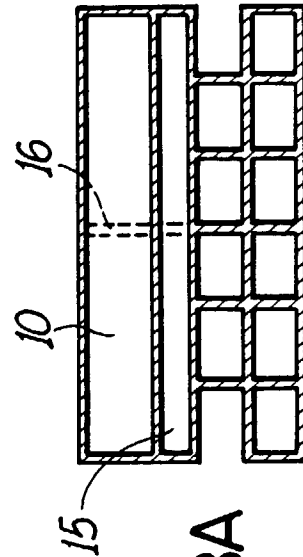
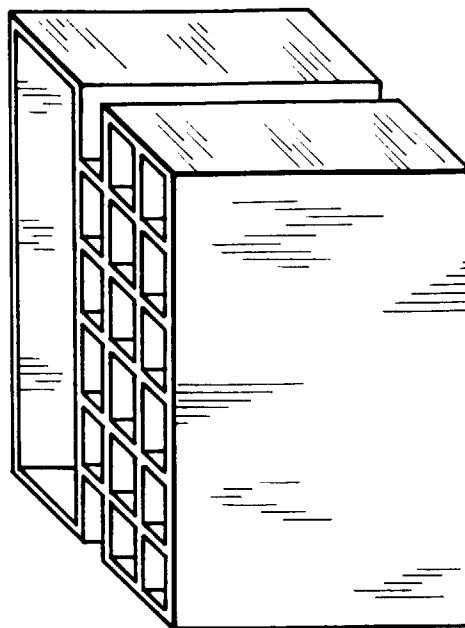


FIG. 3A

FIG. 5A



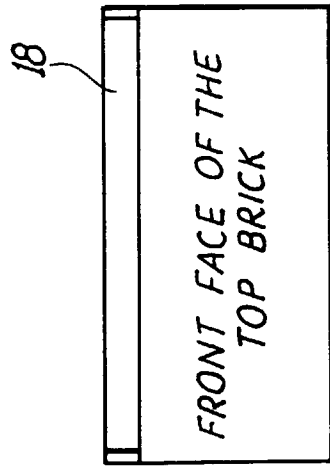


FIG. 6

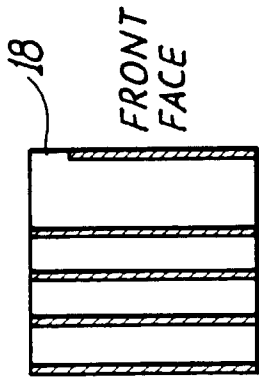


FIG. 8

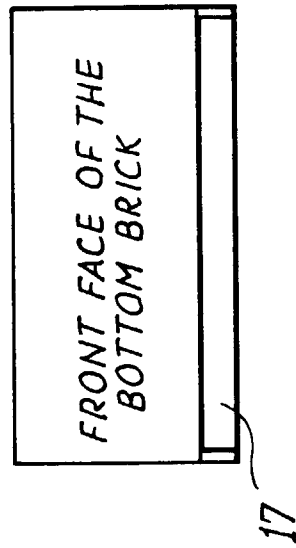


FIG. 7

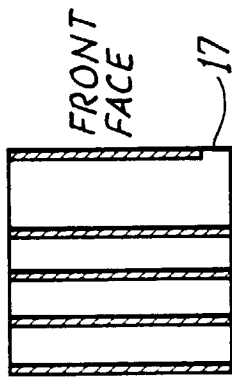


FIG. 9

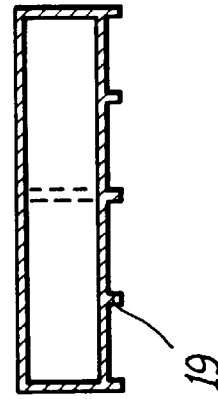


FIG. 10

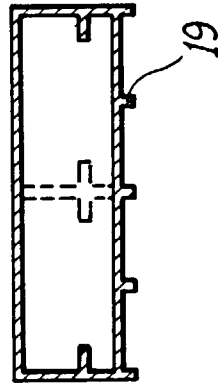


FIG. 11

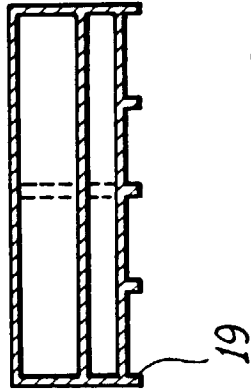


FIG. 12



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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0447

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE-A-36 09 452 (THESZ) * column 4, line 66 - column 8, line 13; figures 1-9 *	1	E04C1/39
A	---	2-5,7-10	
X	EP-A-0 076 732 (G B A) * page 3, line 15 - page 6, line 10; figures 1-8 *	1	
A	---	2,7,9,10	
A	FR-A-2 651 261 (PREVOST) * page 1, line 1 - page 2, line 29; figures 1-6,9 *	1,2,10	
A	CH-A-97 577 (RUCHET) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E04C E04B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11 November 1996	Examiner Ayiter, J
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